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Case Report

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Success of the pain relief drug injections in management of the Bertolloti syndrome: case report and review of the literature

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ABSTRACT

Low back pain accompanied by the lumbosacral transitional vertebra (LSTV) is called the Bertolotti syndrome. This report discussed a case treated with combined corticosteroid and local anesthetic injections based on the literature. A 35-year-old female patient was admitted to the hospital suffering from low back pain. On neurological exam, her left sacroiliac joint was painful on palpation. Her muscle strength was full, but the left patella reflex was hypoactive. X-ray images revealed "Castellvi Type IIa" LSTV on the left side; therefore, it was considered that the patient might have Bertolotti syndrome. Because she did not accept surgical intervention, "betamethasone dipropionate+betamethasone sodium" and "bupivacaine hydrochloride" were injected into her bilateral sacroiliac joints, bilateral L3-4, and L4-5 facets, and left LSVT joint under fluoroscopy. Her low back pain vanished immediately after the procedure, and she was discharged from the hospital with a full recovery. With an interval of about six months, she was hospitalized 5 more times with complaints of recurrent low back pain, and at each hospitalization, "local anesthetic" (LA) alone or "local anesthetic+corticosteroid" (LA+S) combination was injected into the primary trigger zones. During long-term follow-up, she continued his daily life without any problems. This case report showed that sequential LA and LA+S administrations could be curative for patients with Bertolotti syndrome who do not accept surgical treatment, or who cannot undergo surgical intervention. Thus, it was concluded that it would be beneficial to conduct studies with larger samples to obtain more precise information about this method.

Keywords: Lumbosacral transitional vertebra, Bertolotti syndrome, injection

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INTRODUCTION

A lumbosacral transitional vertebra (LSTV) is a congenital spinal deformity involving various degrees of sacralization of the lowest vertebra of the lumbar segment or various degrees of lumbarization of the uppermost component of the sacral segment. It has been reported that it could be found within a range of 4% to 30% of the population.[1,2] The etiology and pathogenesis of lumbosacral transitional vertebral formation are unclear. This condition, which has not been associated with any genetic defect or congenital malformation, is usually detected incidentally. In 4.6% to 7% of patients with low back pain, LSTV can be seen, and if low back pain accompanies the diagnosis of LSTV, this condition is called "Bertolotti syndrome", and Castellvi et al.[3] classified it into four subtypes (**Figure 1**).[4-8]

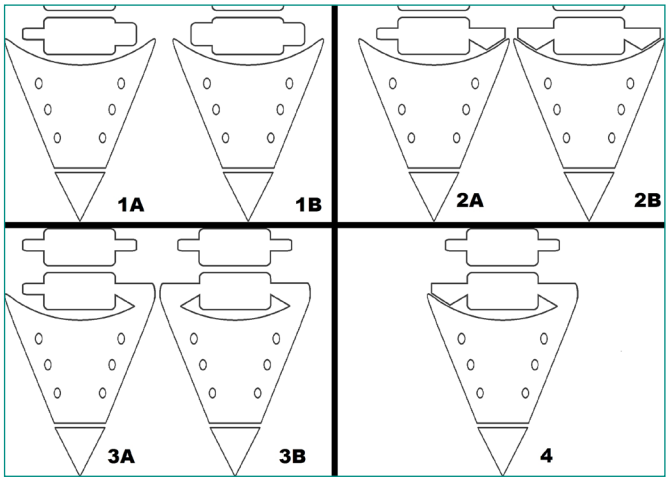

Figure 1: Castellvi classification: Type 1: Enlarged unilateral (1A) or bilateral (1B) dysplastic transverse process; Type 2: Unilateral (2A) or bilateral (2B) pseudoarthrosis between the transverse process and the sacrum; Type 3: Complete unilateral (3A) or bilateral (3B) fusion between the transverse process and the sacrum; Type 4: Pseudoarthrosis on one side and fusion on the other.[3]

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Bertolotti syndrome is often diagnosed at an early age (under 30 years of age).[9-15] However, the currently accepted theory is that this syndrome may result from the excessive axial load on the L4-5 joint and the mechanisms of the spine to compensate for this axial load, and this excessive loading may originate from the partial or complete fusion of the L5-S1 joint(s).[9] Although many treatment modalities (such as pain relief drug injection therapy, radiofrequency ablation, or surgical intervention) have been suggested for the treatment of Bertolotti syndrome, an effective treatment method has not been identified yet.[2,16,17]

In this case report, the success of the injection of corticosteroids combined with local anesthetic drugs or injection of local anesthetic drugs for the treatment of a patient with Bertolotti syndrome was discussed in light of the literature.

CASE

A 35-year-old female patient was admitted to the outpatient clinic with the complaint of increasing low back pain predominantly on the left side for several days. She had no chronic disease in her history. Nineteen years, and ten years ago, she had been operated on twice for different levels of intervertebral disc herniations at another clinic. She did not use any medication regularly.

On her physical exam, she had no limitation in sacroiliac joint movements, but her left sacroiliac joint was painful on palpation, and her low back pain increased on the left when the right side stood on one foot. In addition, she suffered from left-sided low back pain that increased with movement, especially during waist flexion and extension movements. Her muscle strength was normal, but the left-sided patella reflex was hypoactive. The patient's lasque, femoral stretching and FABERE/FADIR (flexion, abduction, external rotation, and extension/flexion, adduction, internal rotation) tests were negative.

On her X-ray images, Castellvi type IIa LSTV was seen on the left side and it was thought that she might have Bertolotti syndrome. The spine was stable on the standing lateral hyperflexion and hyperextension X-ray images (**Figure 2**), and no fracture, tumoral mass, erosion, or sclerosis was detected in bone structures on lumbar CT images (**Figure 3**). However, lumbar MR images revealed the L3-4 intervertebral disc herniation that was migrated in the midline inferiorly and the L4-5 intervertebral disc herniation that protruded in the midline of the spinal canal and left neural foramen (**Figure 4**).

Since the patient did not want to undergo surgical treatment, she accepted the recommended injection therapy and was subsequently hospitalized. On the same day, to relieve her low back pain, she was positioned prone on the operating table in the operating room under sedation anesthesia, and betamethasone dipropionate + betamethasone sodium (Diprospan, Schering Plow Medical Products Trade Inc.) and bupivacaine hydrochloride (Marcaine, SanofiİlaçSan. ve Tic. A.Ş., Turkey) was injected to the primary target points (bilateral sacroiliac joints, bilateral L3-4 facets joints, bilateral L4-5 facets, left LSVT joint, and left L5-S1 neural foramen) using a 22G quincke spinal needle (Braun, Germany) under fluoroscopy (Philips, Netherlands) (**Figure 5**). Her low back pain vanished immediately after the procedure. She had no paresis and hipoestesia, and all of lasque, femoral stretching and FABERE/FADIR tests were still negative. The patient was discharged from the hospital with complete recovery on the same day.

Figure 2: Patient's X-Ray shows the lumbosacral transitional vertebra.

Figure 3: The appearance of the left lumbosacral transitional vertebra on the coronal sections of the patient's computed tomography

Figure 4: In the lumbar magnetic resonance images of the patient,it is seen that the L3-4 intervertebral disc is protruded in the midline inferiorly in the spinal canal(3A), and the L4-5 intervertebral disc is protruded in the midline and left nerve foramen in the spinal canal(3B).

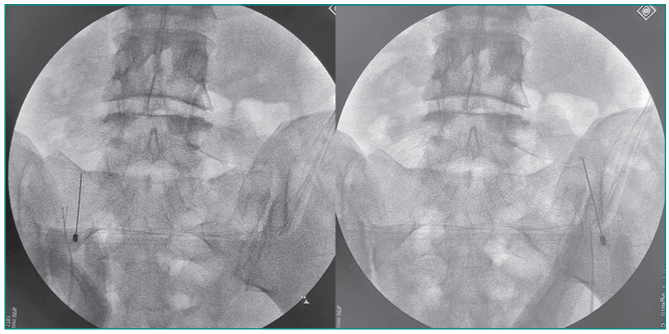

Figure 5: Fluoroscopy images of drug injections applied to relieve the patient's pain.

Since the effect of the injection treatments applied to the patient lasted an average of six months, the injection treatment was repeated every six months. To reduce the corticosteroid load, bupivacaine hydrochloride alone or betamethasone dipropionate+betamethasone sodium combined with bupivacaine hydrochloride was injected alternately every six months on average. During this period, it was learned that she was able to continue her daily work normally and without any problems.

DISCUSSION

The clinical manifestations of LSTV are thought to occur by four main mechanisms: **1)** Problems in the posterior elements, spinal canal, or disc at the level above the transition; **2)** Atypical articulation of spondylolysis in the presence of LSTV; **3)** Contralateral facet joint degeneration in the presence of unilateral LSTV; **4)** Extraforaminal compression due to an enlarged transverse process. Castellvi et al.[8] classified the LSTV into four main groups and subgroups of these groups according to the sides involved and the degree of transition (**Figure 5**). It was reported in the literature that the presence of LSTV Type II and Type IV is correlated with low back pain.[18,19]

For a long time, "Ferguson's Radiography" which is described as A/P lumbosacral radiograph taken at a 30-degree angle to the cranial has been accepted as a standard diagnostic tool for the presence of LSTV. Today, in addition to X-Ray, computed tomography (CT) and magnetic resonance (MR) imaging can show the neural structures and spine in detail and help to determine the decision-making of the treatment methods in patients with LSVT.[2,20] On the other hand, in symptomatic patients, "technetium 99m lumbosacral single-photon emission" tomography (99m Tc SPECT/CT) can be used to define the etiology, and the differential diagnosis of diseases originating from the facet joint or sacroiliac joint. Elevated osteoblastic activity in the LSTV region is specified as a finding in favor of the Bertolotti syndrome. Besides, SPECT/CT may help distinguish patients who can recover with medical treatments or surgical treatment.[15]

In this case, preoperative A/P and dynamic X-rays, CT, and MRI scans were performed and they revealed that the patient had left-sided Castellvi Type IIa LSTV. It was thought that the patient might have Bertolotti syndrome due to the LSVT by low back pain accompanied. No lumbar instability was determined on dynamic lumbar X-ray images, and lumbar CT images revealed no abnormal appearance in the bone structure, and LSVT was found on only the left side. However, MR images revealed L3-4 and L4-5 intervertebral disc herniations, but those disc herniations did not cause any radicular pain or muscle strength loss, although the left-sided patellar reflex was hypoactive. Therefore, this lost reflex finding was thought to be an old deficiency. With these radiological images and neurological examination findings, it was thought that the current low back pain in the patient was caused by LSVT. Although the LSVT was located on the left side, the low back pain of the patient was two-sided. It was thought that the left-sided LSTV might develop the axial imbalance, and cause low back pain indirectly on the right side of the patient. Therefore, bilateral low back pain was associated with LSTV and it was concluded that the patient might have Bertolotti syndrome. The immediate relief of the patient's low back pain after the pain relief drug injections also supported this diagnosis.

To date, various types of conservative treatment (such as analgesic drug use, rest, physiotherapy) and surgical treatment (minimally invasive and invasive) modalities have been described for Bertolotti syndrome in the literature. Minimally invasive surgical treatment options include injection of analgesic and/or anti-inflammatory drugs to the pain side or denervation of the area with radiofrequency.[21,22] Many studies stated that drug injection treatments can provide a 24-month pain-free period in 84-70%of patients, and because of the lower complication rates, it could be considered the primary treatment option. It has also been reported that LSTV can be proven to be the main source of current pain thanks to this drug injection treatment.[22,23] On the other hand, some studies concluded that the success rate of radiofrequency ablation is almost complete, and can be used as the first choice for the improvement of pain in Bertolotti syndrome.[21,24] However, surgical intervention is recommended in the literature for patients with recurrent complaints after pain relief drug injection.[25] Invasive surgical treatment options consist of the removal of the transverse process in that area, osteotomy of the sacral area with a high-speed drill, endoscopic extra foraminal decompression, relief of the area with foraminotomy where the nerve outside the neural foramen is under pressure (far-out syndrome).[26-30]

In our patient, the pain-free time provided by the injection therapy was shorter than the average time stated in the literature. To avoid possible side effects, local anesthetic medication (LA) and combined local anesthetic-corticosteroid medication (LA+S) were administered to the patient sequentially for approximately six-month periods. During the follow-up, it was learned that she could continue her daily life and physical therapy rehabilitation without interruption or any problems.

CONCLUSION

This case report showed that sequential local anesthetic medication and combined local anesthetic + corticosteroid administrations could be curative for patients with Bertolotti syndrome who do not accept surgical treatment, or who cannot undergo surgical intervention. Thus, it was concluded that it would be beneficial to conduct studies with larger samples to obtain more precise information about this method.

ETHICAL DECLARATIONS

Informed Consent: All patients signed the free and informed consent form.

Referee Evaluation Process: Externally peer-reviewed.

Conflict of Interest Statement: The authors have no conflicts of interest to declare.

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Author Contributions: All of the authors declare that they have all participated in the design, execution, and analysis of the paper, and that they have approved the final version.

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I completed my primary education in various cities. In 2006, I started my secondary education at Malatya Science High School. After the placement exam, I have placed Çukurova University Faculty of Medicine in 2010. Before graduation, I visited and lived at the University of Duisburg-Essen, Germany, with the Erasmus student exchange program in 2015. I graduated in 2016 from the faculty of medicine. After completing my compulsory service in the emergency department of Kahramanmaraş Andırın District State Hospital for about 1 year, I started my education as a research assistant at Kırıkkale University Medical Faculty Hospital, Department of Neurosurgery in 2017 for my specialization training. I got married in 2022. At the end of 2022, I defended my graduation thesis and passed my specialization exam. I am still continuing my pre-appointment job at Kırıkkale University.